July 5, 2001

Mr. Ronald A. Milner, Chief Operating Officer
Office of Civilian Radioactive Waste Management
U. S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION'S OBSERVATION AUDIT REPORT NO. OAR-01-05, "OBSERVATION AUDIT OF THE OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT, OFFICE OF QUALITY ASSURANCE, AUDIT NO. EM-ARC-01-09"

Dear Mr. Milner:

I am transmitting the U.S. Nuclear Regulatory Commission's (NRC's) Observation Audit Report (No. OAR-01-05) of the U.S. Department of Energy's (DOE's) Office of Civilian Radioactive Waste Management (OCRWM), Office of Quality Assurance's (OQA's), audit of DOE's Office of Environmental Management (EM), Office of Safety, Health and Security (EM-5). This audit was conducted on June 5 through 7, 2001, at the EM-5 facility in Germantown, Maryland.

The purpose of this audit was to evaluate the effectiveness of EM-5's implementation of the High-Level Waste (HLW) Quality Assurance (QA) Program and to determine if applicable requirements of the OCRWM Quality Assurance Program Description (QARD) were being met. The scope of the audit included evaluating the implementation of the QARD for EM-5 activities controlling the processing of high-level waste at various sites such as the Savannah River Operations Office Defense Waste Processing Facility and the Hanford Office of River Protection. Also, the audit evaluated action taken as a result of the findings and recommendations identified during previous OQA audits.

The NRC observers (observers) determined that this audit was effective in identifying potential deficiencies and recommending improvements for the EM-5 activities reviewed. During the conduct of the audit, both the OQA audit team (audit team) and the observers independently reviewed applicable documents, procedures, and activities within the audit's scope.

During the audit, the audit team identified two potential deficiencies. One potential deficiency identified that certain Memoranda of Agreement, between affected organizations, did not reflect current organizational structures. The second potential deficiency identified the following three problems within the area of corrective action: 1) deficient conditions identified during EM-5 audits were being documented as observations and not deficiencies; 2) EM-5 was not performing trending; and 3) EM-5 had not completed committed corrective action to address a deficiency from the last OQA audit. Further, the audit team made the following two recommendations: 1) additional surveillances should be performed by the high-level waste processing site QA representatives; and 2) the current QARD revision should be formally imposed for EM-5 and applicable site activities.

The observers agreed with the audit team's conclusions, findings, and recommendations presented at the audit exit. Additionally, the observers believe that EM-5 management should continue to review resources designated for QA activities to ensure that they are adequate. Although the OCRWM audit team identified two potential deficiencies, the observers believe that the audits performed by EM-5 were well-planned and adequately evaluated the implementation of the QARD at the various high-level waste processing sites. However, the observers believe that EM-5 needs to refine the methods used for ensuring that deficiencies found during its audits are properly documented. The staff will continue to interface with OCRWM and follow the progress that EM-5 is making to address the issues identified during this audit.

A written response to this letter and the enclosed report is not required; however, we do request that you respond to the open Audit Observer Inquiries from the previous NRC observations identified in Section 5.3 of the attached report. If you have any questions, please contact Larry L. Campbell at (301) 415-5000.

Sincerely,

/RA/

C. William Reamer, Chief
High-Level Waste Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosure: NRC Observation Audit Report
No. OAR-01-05, "Observation Audit
of the Office of Civilian Radioactive
Waste Management, Office of Quality Assurance,
Audit No. EM-ARC-01-09"

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A written response to this letter and the enclosed report is not required; however, we do request that you respond to the open Audit Observer Inquiries from the previous NRC observations identified in Section 5.3 of the attached report. If you have any questions, please contact Larry L. Campbell at (301) 415-5000.

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No. OAR-01-05, "Observation Audit
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Waste Management, Office of Quality Assurance,
Audit No. EM-ARC-01-09"

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U.S. NUCLEAR REGULATORY COMMISSION

OBSERVATION AUDIT REPORT NO. OAR-01-05

"OBSERVATION AUDIT OF THE

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT,

OFFICE OF QUALITY ASSURANCE

AUDIT NO. EM-ARC-01-09"

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1.0 INTRODUCTION

Office of Environment Management (Background)

In 1989, the Secretary of Energy created the Office of Environmental Restoration and Waste Management, later named the Office of Environmental Management (EM), to consolidate budgets and staff devoted to similar environmental tasks within the U.S. Department of Energy (DOE) into a single program office. The major categories of wastes controlled by EM include high-level waste; transuranic waste; low-level waste; mixed low-level waste; 11e(2) byproduct material; hazardous waste; and other wastes. EM oversees all of DOE's high-level waste at the following four sites: a) Hanford Office of River Protection Site (Hanford); b) Idaho National Environmental and Engineering Laboratory (INEEL); c) the Savannah River Site's Defense Waste Processing Facility (Savannah River); and d) West Valley Demonstration Project (WVDP), a non-weapons site, owned by New York State and managed by DOE. Hanford manages the largest volume of high-level waste while Savannah River manages a larger amount of radioactivity in its high-level waste.

Under Federal law, DOE high-level waste may eventually be disposed of in a potential geologic repository at Yucca Mountain, Nevada, after it has been processed into a solid waste form. The DOE Office of Civilian Radioactive Waste Management (OCRWM) is responsible for: 1) characterizing the potential geologic repository at Yucca Mountain; 2) possibly constructing the geologic repository; and 3) disposing of DOE high-level waste, DOE spent nuclear fuel, and Naval spent nuclear fuel into the geologic repository. DOE began to vitrify the high-level waste in May 1996 at Savannah River and in July 1996 at the WVDP. Final treatment of high-level waste at Hanford and INEEL is now in the planning stage.

Performance of the Audit

Staff from the U.S. Nuclear Regulatory Commission (NRC), Division of Waste Management, observed DOE's OCRWM, Office of Quality Assurance's,(OQA's), audit of activities regarding EM's Office of Safety, Health and Security's (EM-5's), implementation of the High-Level Waste (HLW) Quality Assurance (QA) Program. This audit was conducted on June 5 through 7, 2001, at the EM-5 facility in Germantown, Maryland.

The purpose of this audit was to evaluate the effectiveness of EM-5's implementation of the HLW QA Program and to determine if applicable requirements of the OCRWM Quality Assurance Program Description (QARD), DOE/RW-0333P, Revision 10, were being met. The scope of the audit was to evaluate the implementation of the QARD for EM-5 activities controlling the processing of high-level waste at various sites such as the Savannah River and Hanford. Also, the audit evaluated action taken as a result of the findings and recommendations identified during previous OQA audits.

The NRC observers' (observers') objective was to assess whether OQA and EM-5 were properly implementing the requirements contained in Subpart G, "Quality Assurance," to Part 60, of Title 10 of the U.S. Code of Federal Regulations (10 CFR Part 60) and the provisions contained in the QARD.

This report presents the observers' determination of how effective the OQA audit was, and whether EM-5 implemented adequate QARD controls in the audited areas.

2.0 MANAGEMENT SUMMARY

Within the areas evaluated, the audit team identified two potential deficiencies. One potential deficiency identified that certain Memoranda of Agreement (MOAs), between affected organizations, did not reflect current organizational structures. The second potential deficiency identified the following three problems within the area of corrective action: 1) deficient conditions identified during EM-5 audits were being documented as observations and not deficiencies; 2) EM-5 was not performing trending; and 3) EM-5 had not completed committed corrective action to address a deficiency from the last OQA audit. Further, the audit team made the following two recommendations: 1) additional surveillance should be performed by the site QA representatives; and 2) the current QARD revision should be formally imposed for EM-5 and applicable site activities, and the various QARD matrixes should reflect that they meet the current QARD requirements. Overall, the audit team concluded that the QARD program had been satisfactorily implemented in the areas evaluated.

The observers determined that OQA Audit EM-ARC-01-09 was well-planned and effectively executed. The audit team members were independent of the activities they audited and were knowledgeable in the QA and technical disciplines within the scope of the audit. The audit team member's qualifications were reviewed and were found acceptable.

In general, the observers agreed with the audit team's conclusions, findings, and recommendations presented at the audit exit. Additionally, the observers believe that EM-5's management should continue to review resources designated for QA activities and to ensure that they are adequate. Although the audit team identified two potential deficiencies in the areas of organization and corrective action, the observers believe that the audits performed by EM-5 were well-planned and adequately evaluated the implementation of the QARD at the various high-level waste processing sites. However, the observers believe that EM-5 needs to refine the methods used for ensuring that deficiencies found during its audits are properly documented.

The staff will continue to interface with OCRWM and follow the progress that EM-5 is making to address the issues identified during this audit.

3.0 AUDIT PARTICIPANTS

3.1 Observers

Larry L. Campbell	Team Leader	NRC
Jeff Ciocco (Part Time)	Technical Specialist	NRC
Thomas Matula (Part Time)	QA Specialist	NRC

3.2 OQA Audit Team

Marilyn A. Kavchak	Audit Team Leader	OQA/Navarro Quality Systems (OQA/NQS)
Lester W. Wagner	Auditor	OQA/NQS

4.0 REVIEW OF THE AUDIT AND AUDITED ORGANIZATION

This OQA audit of EM-5 was conducted in accordance with OCRWM Quality Assurance Procedure (QAP) 18.2, "Internal Audit Program," and QAP 16.1Q, "Performance/Deficiency Reporting." The NRC staff's observation of this audit was based on NRC Manual Chapter 2410, "Conduct of Observation Audits," dated July 12, 2000.

4.1 Scope of the Audit

The scope of the audit included the following QARD elements: 1) Organization; 2) QA Program; 3) Implementing Documents; 4) Document Control; 5) Corrective Action; 6) QA Records; 7) Audits; and 8) High-Level Waste Form Production. Further, the audit evaluated the implementation of the QARD for EM-5 activities controlling the processing of high-level waste at various sites such as the Savannah River and Hanford. Also, the audit evaluated action taken as a result of the findings and recommendations identified during previous OQA audits.

The observers focused their efforts on: 1) the organizational structure of EM-5 and the various sites processing high-level waste; 2) the adequacy of EM-5's audits and oversight of the sites; and 3) EM-5's review of the processing and packaging of high-level waste.

The audit team and observers evaluated the implementation of the following procedures and agreements for the audited activities during the audit:

<u>Procedures</u>

OCRWM Procedures

a) Quality Assurance Procedure (QAP)-18.1Q, "Auditor Qualification," Revision 6, with ICN No. 0

b) QAP-18.2Q, "Internal Audit Program," Revision 8, with ICN No. 0

EM-5 Procedures

a) QARD Requirements Matrix, Draft Revision 4

b) Standard Practice Procedure (SSP) 1.02, Revision 5, "High-Level Waste Vitrification Program Organization," with ICN No. IC-5-1

c) SSP No. 2.01, "Procedures and QARD Requirements Matrix," Revision 3

d) SSP No. 3.01, "Training," Revision 3
e) SSP No. 4.01, "Evaluation and Assessment Activities," Revision 2

f) SSP No. 4.02, “Audits,” Revision 5

g) SSP No. 4.03, “Readiness Reviews and Surveillance,” Revision 2

h) SSP No. 4.04, “Technical and QA Documents,” Revision 4

i) SSP No. 5.01, “ Deviations and Corrective Actions/Tracking System,” Revision 2

j) SSP No. 5.02, “Stop Work Orders,” Revision 2

k) SSP No. 6.01, “Distribution of Controlled Documents, Revision 3

l) SSP No. 7.01, “Quality Records,” Revision 3

m) SSP No 8.01, “Differing Staff Opinions,” Revision 2

MOAs

a) “MOA for Coordination of QA Activities between EM and OCRWM,” dated December 23, 1998

b) “MOA for Coordination and Implementation of High-Level Radioactive Waste QA Activities between the Office of River Protection and EM,” dated June 23, 1999

4.2 Conduct and Timing of the Audit

The audit was performed effectively and the audit team demonstrated a sound knowledge of the applicable EM-5 and OCRWM programs and procedures. The audit checklist was developed using the QARD and applicable EM-5 implementing procedures. Audit team members conducted thorough interviews; they challenged responses, when appropriate; and they effectively employed their detailed audit checklists. The observers concluded that the timing of the audit was appropriate for the auditors to evaluate ongoing EM-5 activities. The audit team and the observers caucused at the end of each day. Meetings between the audit team and EM-5 (with the observers present) were held, as necessary, to discuss the current audit status and preliminary findings.

4.3 Audit Team Qualification and Independence

The qualifications of the audit team were reviewed for accuracy and completeness in accordance with the requirements of DOE Procedure QAP 18.1, “Auditor Qualification.” The observers’ review included an examination of the training, education, and experience of the audit team members. The observers concluded that the audit team members had the necessary expertise to perform the audit and were qualified to audit EM-5 activities.

The observers reviewed organizational information and determined that the audit team members were independent of any direct responsibility for performing audited activities. The observers concluded that the auditors had sufficient authority and organizational freedom to make the audit process meaningful and effective.

4.4 Examination of QA Elements

4.4.1 Organization

Organizationally, DOE manages the high-level waste program through its Headquarters program offices and the many field and operations offices. Seven offices report to the Assistant Secretary for Environmental Management. EM has overall responsibility for developing, qualifying, and producing an acceptable HLW form for OCRWM. The HLW QA Program is managed by EM-5. EM-5 consists of a Safety and Health Team, Package Certification Team, Safeguards and Security Team, and Quality Systems Team. The Quality Systems Team oversees the programs in QA, 3D (data, decision, and documentation), Emergency Management, and Risk Management. QA in EM-5 has diverse responsibilities that include providing guidance and support on matters affecting high-level waste acceptance QA and interfacing and program coordination with other QA programs, both within EM and across the DOE complex. The HLW QA Manager is located within EM-5.

There are several other offices within EM that are involved in the budgeting, planning, and execution of the high-level waste vitrification projects. The Office of Integration and Disposition has the primary responsibility for coordinating the inventory of high-level waste for the potential geological repository with OCRWM. The Office of Site Closure's Ohio Office, is responsible for WVDP. The Office of Project Completion's Idaho Office, Savannah River Office, and River Protection Office are responsible for the remainder of EM's high-level waste vitrification projects.

The audit team and observers reviewed several of the MOAs that describe, in part, the quality and technical agreements for a defined scope of work. The audit team identified, and discussed with EM-5, that the present MOAs do not reflect the current organization structure within EM. The audit team identified this condition as a potential deficiency.

The observers agreed with the audit team's findings in this area.

4.4.2 QA Program and the QARD Requirements Matrixes

The audit team verified that the EM-5 QARD Requirements Matrix had been updated to reflect the QARD requirements. Also, the audit team evaluated whether the appropriate justification had been provided for any exceptions taken. The audit team verified that revisions to the QARD had been evaluated by EM-5 and the sites processing high-level waste by reviewing documented QARD revision impact statements. The audit team identified one potential deficiency in this area: EM-5 has taken exception to the QARD requirements for trending. EM-5 only performs oversight of the trending function and has delegated the responsibility for trending to the QA organizations at the various high-level waste processing sites. The audit team considered this to be an inappropriate delegation and not consistent with the intent of the QARD. The audit team identified that trending should be at the EM-5 level as well as at the site level.

Also, the audit team found that: 1) The EM-5 and the various processing site QARD Requirements Matrix do not reflect the current QARD revision level; and 2) EM-5 did not formally invoke the latest QARD revision for the site QARD Requirements Matrix. Although QARD revision impact reviews were performed by the processing site QA representatives, the audit team recommended that EM-5 consider requiring all QARD Requirements Matrixes to reflect that the current revision of the QARD needed to be met.

The observers agreed with the audit team's findings in this area.

4.4.3 EM-5 Audit Reports

During the audit, the audit team and observers reviewed the following EM-5 audit reports and their completed checklists:

a) "Quality Assurance Program Audit by the Office of Safety, Health, and Security (EM-5) at the DOE West Valley Demonstration Project (WVDP)," July 10-14, 2000

b) "Office of River Protection HLW QAP Audit," August 22-25, 2000

c) "Savannah River (SR) Operations Office Defense Waste Processing Facility (DWPF), High-Level Waste (HLW) Audit," March 19-22, 2001

The audit team concluded that these audits were performed in accordance with applicable QARD and EM-5 procedures requirements with one exception. The audit team identified that certain deficient conditions discovered during the audits were incorrectly identified as observations. The audit team identified this condition as a potential deficiency. The observers agreed with this potential deficiency and believe that EM-5 needs to refine the methods used for ensuring that deficiencies found during audits are properly documented. Further, the observers discussed with the audit team that the previous OQA audit report for EM-5 identified a similar condition. Also, the audit team recommended that the high-level waste site QA organizations should implement additional surveillance activities to enhance the audit process.

During the review of the audit reports, the observers found two versions of the nonconformance report DCAR No. 00VP-RL-AU-01-D01. One version was dated August 24, 2000, and the other dated August 25, 2000. Both versions contained the same essential information but were different in format. This observer brought this information to the attention of the audit team and later to the attention of EM-5. The EM-5 HLW QA Program Manager informed the audit team that, when nonconformance reports are written, the auditor routinely prepares preliminary copies, issues them to the organization being audited, and later issues the final versions with the audit reports. The audit team noted that the preliminary version of DCAR No. 00VP-RL-AU-01-D01 was not identified as "Draft" and, as such, could lead to confusion. The EM-5 HLW QA Program Manager stated that EM-5 will change its procedures to mark preliminary copies of nonconformance reports as "Draft" in the future.

The observers agreed with the audit team's findings in this area.

4.4.4 EM-5 Training and Qualification Records

The audit team and observers reviewed the training and qualification records for several of the EM-5 audit team members and found them acceptable. The observers agreed with the audit team findings in this area. However, as discussed in Section 4.4.6 of this report, EM-5's commitment to assign a full-time Federal employee, qualified to performs audits, at EM-5's Germantown facility, remains an open issue.

4.4.5 Technical and QA Documents

The audit team and observers discussed the performance-based aspects of EM-5 audits and were informed that EM-5 audit teams included at least one technical specialist. The observers

requested, and were provided with the "West Valley Demonstration Project (WVDP), West Valley, New York, Production Records for Canistered Waste Form" boiler-plate-format document, a typical example of a production record. EM-5 QA personnel informed the observers that the technical specialists on EM-5 audit team reviewed production records during the EM-5 audits.

The audit team and observers reviewed EM-5 audit reports and associated checklists and found that the technical specialist's review included canistered waste form production records and the processing of high-level waste.

4.4.6 Review of Deficiencies from Past Audits

The audit team and observers reviewed EM-5's processing and corrective action for Deficiency Report (DR) No. DR-EM-00-D-101, dated June 6, 2000. This DR was written during the last OQA audit of EM-5 activities and identified that no objective evidence could be provided that QA support personnel at the EM-5 Germantown facility ". . . have the requisite experience in QA which supports the requirements for the position assigned." The DR's corrective action to prevent recurrence included the following statement: "EM senior management has committed to fully support the HLW QA Program and as part of this commitment, will provide necessary Federal full-time personnel needed to support the HLW QA Program." The audit team found that the identified corrective action for DR-EM-00-D-101 had not been completed as committed because no full-time Federal employee with QA experience had been hired. The audit team identified this condition as a potential deficiency.

The observers agreed with the audit team's findings in this area.

4.4.7 Summary: Deficiencies and Recommendations Identified by the DOE Audit Team

The audit team identified two potential deficiencies. One potential deficiency identified that certain MOAs, between affected organizations, did not reflect current organizational structures. The second potential deficiency identified the following three problems within the area of corrective action: 1) deficient conditions identified during EM-5 audits were being documented as observations and not deficiencies; 2) EM-5 was not performing trending; and 3) EM-5 had not completed committed corrective action to address a deficiency from the last OQA audit.

Further, the audit team made the following two recommendations: 1) The site QA representatives should perform additional surveillance; and 2) the current QARD revision should be formally imposed for EM-5, and applicable site activities and the various QARD Requirements Matrixes should reflect that they meet the current QARD requirements.

5.0 NRC STAFF FINDINGS

The observers determined that OQA Audit EM-ARC-01-09 was effective in determining the level of compliance of EM-5 activities associated with the oversight of high-level waste processing activities. The observers agreed with the audit team's conclusion that the QARD had been satisfactorily implemented except for the identified potential deficiencies. The following sections address the observers' findings.

5.1 NRC Audit Exit Summary

During the audit exit, the observers expressed appreciation for the excellent cooperation and responsiveness provided to them during their observation activities. In addition, the observers stated that, in general, they agreed with the audit team findings and recommendations, as presented at the audit exit. Also, during the audit exit meeting, the observers discussed the following:

- Notwithstanding the deficiencies and recommendations identified by the audit team, the observers believed that the audits performed by EM-5 were well-planned and adequately evaluated the implementation of the QARD at the various high-level waste processing sites. However, the observers agreed with the audit team that EM-5 needs to refine the methods used for ensuring that deficiencies found during its site audits are properly documented.

- The observers stated that should DOE file an application for a high-level waste repository at Yucca Mountain, Nevada, it would be subject to NRC inspection, and that EM activities would also be subject to inspection. Further, the observers stated that one aspect of these inspections includes evaluating management support for activities affecting quality, including the area of QA. Additionally, the observers stated that EM-5 management should continue to review resources designated for QA activities to ensure that they are adequate.

- NRC may observe EM-5 audit activities during fiscal year 2001, as provided for in the various MOAs with the high-level waste sites.

- The observers agreed with the OCRWM audit team's conclusions, findings, and recommendations presented at the audit exit.

- The staff will continue to interface with OCRWM and follow the progress that EM-5 is making to address the issues identified during this audit.

5.2 NRC Audit Observer Inquiries

There were no Audit Observer Inquires (AOIs) written during this audit.

5.3 Open NRC AOIs from Previous NRC Observations

The following AOIs remain open from previous NRC audits:

a) AOI No. M&O-APR-01-02-4, dated February 9, 2001, was written to identify an observer inquiry for ANL-NBS-HS-00032. The AOI states: "The work upon which this model is based (Flint, et al., 1996, "Conceptual and Numerical Model of Infiltration at Yucca

Mountain") is unqualified. (See OCRWM QA Audit Report M&O APR-00-04)(p. 9). Was information used to support conclusions made in the Infiltration AMR? If yes, describe how the Flint, et al. (1996) data were qualified and assumptions verified. NRC requests additional information and details. (Refer to U.S. NRC's Observation Audit Report No. OAR-00-04)."

b) AOI No. M&O-APR-01-01-01, February 2001, was written to identify an observer inquiry for ANL-EBS-MD-000033. Several agreements made at the NRC/DOE Technical Exchange (January 9-12, 2001, Pleasanton, CA) on Evolution of the near Field Environment (EMFE) indicate that new data and analysis will be presented in the "EBS: Physical and Chemical Environment Model AMR (ANL-EBS-MD-000033)," expected to be available in FY 02. The following NRC/DOE agreements point specifically to the FY 02 revision of this AMR: ENFE 2.04; ENFE 2.06; ENFE 2.08; ENFE 2.11; ENFE 2.13, and ENFE 2.18. ENFE 2.05 and ENFE 2.17 also point to this AMR, although they state the information can be provided in other documents as appropriate. During the M&O-ARP-01 audit of ANL-EBS-MD-000033, Rev. 01, in Las Vegas, NV (February 20-23, 2001), however, audit team members questioned the usefulness of producing additional revisions of this AMR. If data and analyses required to fulfill NRC/DOE agreements listed above are not presented in a FY 02 revision of the ANL-EBS-MD-000033 AMR, where will this information be presented?" (Refer to U.S. NRC's Observation Audit Report No. QAR-01-03).

5.4 AOIs Closed or Transferred

The following AOIs were transferred and are now being tracked as unsaturated zone issues to be discussed during the Total System Performance Assessment Issues Technical Exchange.

a) AOI No. M&O-APR-01-02-1, dated February 9, 2001, was written to identify an observer inquiry for ANL-NBS-HS-00032. The AOI states: "Arbitrary upper-bound vegetation cover percentages and bedrock root-zone thicknesses were assigned: 20% and 2.0 m for the modern climate; 40% and 2.5 m for the monsoon climate and 60% and 3.0 m for the glacial transition climate. A more detailed discussion of the assumed values is needed since the values may be excessive, thus leading to an over-prediction of ET and under-prediction of shallow infiltration. (Refer to U.S. NRC's Observation Audit Report No. OAR-00-04)."

Transferred: New Technical Exchange Tracking No. UZ1.3.1

b) AOI No. M&O-APR-01-02-2, dated February 9, 2001, was written to identify an observer inquiry for ANL-NBS-HS-00032. The AOI states: "The instantaneous flow routing (IFR) method assumes that the duration of surface-water flow at Yucca Mountain is less than 24 hours and episodic in nature. This assumption is the basis for not using time-steps smaller than 24 hours when performing surface-water flow routing and calculating daily net infiltration. Please provide the NRC with adequate justification. (Refer to U.S. NRC's Observation Audit Report No. OAR-00-04)."

Transferred: New Technical Exchange Tracking No. UZ1.5.1

c) AOI No. M&O-APR-01-02-3, dated February 9, 2001, was written to identify an observer inquiry for ANL-NBS-HS-00032. The AOI states: "An implicit assumption of the distribution-parameter water-balance model is that capillarity is not an important component of UZ flow processes for the objective of estimating annual average infiltration rates in the semi-arid climate of Yucca Mountain. The INFIL ver. 2.0 contains

both the distribution-parameter water-balance module and the Richards module and could readily be used to confirm the basis for this assumption for a small scale region. The NRC recommends that the assumptions in the distribution-parameter water-balance model be validated by comparison against a numerical Richards equation-based code to assure that mean annual shallow infiltration estimates are not under-predicted. (Refer to U.S. NRC's Observation Audit Report No. OAR-00-04)."

Transferred: New Technical Exchange Tracking No. UZ1.2.1